

1 WHAT IS CLAIMED IS:

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3 1. An antioxidant system comprising:

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5 a. sulfurized isobutylene and

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7 b. one or more hindered phenols.

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9 2. An antioxidant system of Claim 1 wherein the hindered phenols
10 comprise BHT and 3,5-di-t-butyl 4-hydroxy phenol propionate.

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12 3. An antioxidant system of Claim 1 wherein the hindered phenols
13 comprise BHT.

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15 4. An antioxidant system of Claim 1 wherein one or more hindered
16 phenols have the general formula:

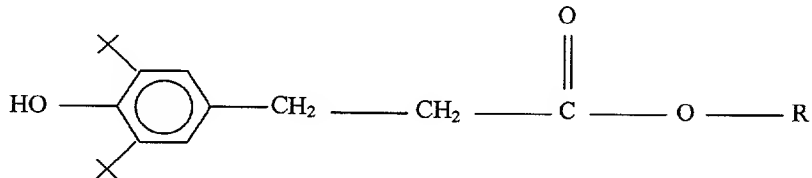
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22 5. An antioxidant system of Claim 4, wherein the antioxidant system
23 further comprises BHT.

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25 6. An antioxidant system of Claim 1 wherein the one or more hindered
26 phenols comprise 3,5-di-t-butyl 4-hydroxy phenol propionate.

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28 7. Lubricating oil comprising a base oil and the antioxidant system of
29 Claim 1.

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31 8. Lubricating oil comprising a base oil and the antioxidant system of
32 Claim 2.

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- 1 9. Lubricating oil comprising a base oil and the antioxidant system of
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- 4 10. Lubricating oil comprising a base oil and the antioxidant system of
5 Claim 4.
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- 7 11. A method of lubricating engines comprising contacting the lubricating
8 oil of Claim 7 with one or more engines.
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- 10 12. A method for making a lubricating oil comprising combining the
11 antioxidant system of Claim 6 with base oil in any order.
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- 13 13. A method of lubricating engines comprising lubricating one or more
14 engines with the lubricating oil of Claim 8.
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- 16 14. A method of lubricating engines comprising contacting one or more
17 engines with the lubricating oil of Claim 9.
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- 19 15. A method of lubricating engines comprising contacting one or more
20 engines with lubricating oil of Claim 10.
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- 22 16. A method of Claim 15 wherein the engine is a natural gas fueled
23 engine.
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- 25 17. Lubricating oil comprising:
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27 about 1 wt. % to about 8 wt. % of one or more dispersants;
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29 about 1 wt. % to about 8.5 wt. % of one or more detergents;
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31 about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors;
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33 about 0.01 wt. % to about 0.5 wt. % sulfurized isobutylene;

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about 0.1 wt. % to about 3 wt. % butylated hydroxy toluene;
and about 0.1 wt. % to about 3 wt. % 3,5-di-t-butyl 4-hydroxy phenol
propionate.

18. A method of lubricating engines comprising lubricating one or more
engines with the lubricating oil of Claim 17.

19. A method of making the lubricating oil of Claim 17 comprising
combining;

about 1 wt. % to about 8 wt. % of one or more dispersants;

about 1 wt. % to about 8.5 wt. % of one or more detergents;

about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors;

about 0.01 wt. % to about 0.5 wt. % sulfurized isobutylene;

about 0.1 wt. % to about 3 wt. % butylated hydroxy toluene; and

about 0.1 wt. % to about 3 wt. % 3,5-di-t-butyl 4-hydroxy phenol
propionate in any order.

20. Lubricating oil comprising:

a major amount of one or more base oils;

about 1.25 wt. % to about 6 wt. % of one or more dispersants;

about 2 wt. % to about 6 wt. % of one or more detergents;

1 about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors;
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3 about 0.02 wt. % to about 0.45 wt. % sulfurized isobutylene;
4
5 about 0.20 wt. % to about 2.5 wt. % butylated hydroxy toluene; and
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7 about 0.20 wt. % to about 2.5 wt. % 3,5-di-t-butyl 4-hydroxy phenol
8 propionate.
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10 21. A method of lubricating engines comprising contacting one or more
11 engines with the lubricating oil of Claim 20.
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13 22. A method of making the lubricating oil of Claim 20 comprising
14 combining:

15 a major amount of one or more base oils;
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17 about 1.25 wt. % to about 6 wt. % of one or more dispersants;
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19 about 2 wt. % to about 6 wt. % of one or more detergents;
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21 about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors;
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23 about 0.02 wt. % to about 0.45 wt. % sulfurized isobutylene;
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25 about 0.20 wt. % to about 2.5 wt. % butylated hydroxy toluene; and
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27 about 0.20 wt. % to about 2.5 wt. % 3,5-di-t-butyl 4-hydroxy phenol
28 propionate in any order.
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30 23. Lubricating oil comprising:
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32 a major amount of one or more base oils;
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1 about 1.25 wt. % to about 6.00 wt. % of one or more dispersants;
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3 about 2 wt. % to about 6 wt. % of one or more detergents;
4
5 about 0.30 wt. % to about 0.80 wt. % of one or more wear inhibitors;
6
7 about 0.02 wt. % to about 0.45 wt. % sulfurized isobutylene,
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9 about 0.20 wt. % to about 2.5 wt. % butylated hydroxy toluene;
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11 and about 0.20 wt. % to about 2.50 wt. % 3,5-di-t-butyl 4-hydroxy
12 phenol propionate.
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14 24. A method of lubricating engines comprising contacting one or more
15 engines with the lubricating oil of Claim 23.
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17 25. Lubricating oil for use in engines comprising sulfurized isobutylene.
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19 26. Method of lubricating natural gas engines comprising contacting the
20 lubricating oil of Claim 25 with one or more natural gas engines.
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22 27. Lubricating oil comprising:
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24 about 0.02 wt. % to about 2 wt. % sulfurized isobutylene;
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26 about 1 wt. % to about 8 wt. % of one or more dispersants;
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28 about 1 wt. % to about 8.5 wt. % of one or more of phenates,
29 salycilates and sulfonates;
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31 about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors; and
32 one or more of Group I, II, III and IV base oil.
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- 1 28. A method of making the lubricating oil of Claim 27 comprising blending
2 about 0.02 wt. % to about 2 wt. % sulfurized isobutylene;
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4 about 1 wt. % to about 8 wt. % of one or more dispersants;
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6 about 1 wt. % to about 8.5 wt. % of one or more of phenates,
7 salycilates and sulfonates;
8
9 about 0.2 wt. % to about 1.5 wt. % of one or more wear inhibitors; and
10
11 one or more of Group I, II, III and IV base oil in any order with agitation
12 and at a temperature sufficient to blend the components but not high
13 enough to degrade the components.
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- 15 29. A method of lubricating an engine comprising lubricating the engine
16 with the lubricating oil of Claim 27.
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- 18 30. Lubricating oil comprising:
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20 a major amount of one or more base oils;
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22 about 1.25 wt. % to about 6 wt. % of one or more dispersants;
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24 about 2 wt. % to about 6 wt. % of one or more detergents;
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26 about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors; and
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28 about 0.04 wt. % to about 1.75 wt. % sulfurized isobutylene.
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- 30 31. A method of making the lubricating oil of Claim 30 comprising
31 combining about 1.25 wt. % to about 6 wt. % one or more dispersants;
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33 about 2 wt. % to about 6 wt. % of one or more detergents;

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2 about 0.3 wt. % to about 0.8 wt. % of one or more wear inhibitors; and
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4 about 0.04 wt. % to about 1.75 wt. % sulfurized isobutylene
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6 in any order.
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8 32. A method of lubricating engines comprising contacting the lubricating
9 oil of Claim 30 with one or more engines.